

What is claimed is:

1. A ring configuration method in a mesh network consisting of a plurality of nodes, each of said nodes having a cross-connecting function, wherein a ring network (herein after
5 called a ring) comprising a working path and a stand-by path is configured dynamically in response to a request for setting said working path.
2. The ring configuration method according to claim 1, wherein a ring map containing at least information about the link of
10 said ring, information about input/output ports at each of nodes along channels constituting said ring, and local node numbers (addresses) locally assigned to the nodes in said ring is provided to the nodes constituting said ring.
3. The ring formation method according to claim 1, wherein
15 said mesh network is a WDM (Wavelength Division Multiplex)-based optical fiber communication network.
4. The ring configuration method according to claim 3, wherein, if a new ring to be configured is identical to an existing ring using the same wavelength as that of said new ring, the same
20 node numbers as node numbers locally assigned to nodes in said existing ring are assigned to the corresponding nodes to each node of said existing ring in said new ring.

5. The ring formation method according to claim 3, wherein, if said new ring crosses or is adjacent to said existing ring using in the same wavelength, local node numbers different from those of the nodes in said existing ring are assigned to the
5 nodes in said new ring.

6. The ring configuration method according to claim 3, wherein a new ring to be configured is identical to or crosses an existing ring using the same wavelength of the new ring, a section of a stand-by path that is common to both of the rings is shared
10 between the rings.

7. The ring configuration method according to claim 1, wherein a network management system centrally performs network map generation, path calculation, path setting, generation of said ring map, and the provision of said ring map to each node, by
15 collecting information about connections between nodes and available channels.

8. The ring configuration method according to claim 1, wherein each node uses a routing protocol and signaling protocol to perform in a distributed manner network map generation, path calculation,
20 path setting, and generation of said ring map, by collecting information about connections between nodes and available channels.

9. A failure recovery method in a mesh network using the ring configuration method according to claim 1, wherein, if a failure

occurs in said working path, nodes perform signaling for failure recovery to cause traffic to switch to said stand-by path to recover the network from the failure.

10. A node address assignment method in dynamically configuring
5 a new ring network including a working path in response to a request for setting the working path in a mesh network consisting of a plurality of nodes, each of said nodes having a cross-connecting function, wherein: if the new ring to be configured is identical to an existing ring, the same node numbers
10 (addresses) as those assigned locally to nodes in said existing ring are assigned to the corresponding nodes to said existing ring in said new ring.

11. The node address assignment method according to claim 10,
wherein, if said new ring crosses or is adjacent to said existing
15 ring, local node numbers different from those of the nodes in said existing ring are assigned to the nodes in said new ring.

12. A node address assignment method in dynamically configuring
a new ring network including a working path in response to a request for setting the working path in a mesh network consisting
20 of a plurality of nodes, each of said nodes having a cross-connecting function, wherein if the new ring to be configured crosses or is adjacent to said existing ring, local node numbers different from those of the nodes in said existing ring are assigned to the nodes in said new ring.

13. The node address assignment method according to claim 10, wherein said ring network is a ring comprising said working path and a stand-by path for said working path.

14. The node address assignment method according to claim 10,
5 wherein said mesh network is a WDM (Wavelength Division Multiplex)-based optical fiber communication network.

15. The node address assignment method according to claim 14, wherein the determination whether said new ring is identical to, crosses, or is adjacent to said existing ring is made in
10 terms of wavelength.

16. A node device in a mesh network configured in such a way that a ring network (ring) consisting of a working path and a stand-by path is dynamically configured in response to a request for setting said working path, said node device comprising a
15 ring map including at least information about the link of said ring, information about input/output port at each node of channels constituting said ring, and a local node number (address) assigned locally to each node constituting said ring.

17. The node device according to claim 16, wherein said mesh
20 network is a WDM (Wavelength Division Multiplex)-based optical fiber communication network.

18. The node device according to claim 17, wherein, if a new ring is identical to an existing ring using the same wavelength,

in said ring map, the same node numbers as node numbers locally assigned to nodes in said existing ring are assigned to the corresponding nodes to said existing ring in said new ring.

19. The node device according to claim 17, wherein, if said
5 new ring crosses or is adjacent to said existing ring using the same wavelength, in said ring map, local node numbers different from those of the nodes in said existing ring are assigned to the nodes in said new ring.

20. The node device according to claim 16, wherein a management
10 system managing the network centrally manages and provides said ring map to each node device.

21. The node device according to claim 16, wherein each node
uses a routing protocol and signaling protocol to perform in
a distributed manner generation of the network map, path
15 calculation, path setting, and generation of said ring map by
collecting information about connections between nodes and
available channels.